ciling the discrepancies of the curve which represents this inequality for different places; discrepancies which have hitherto been a source of much perplexity. These differences in the semimenstrual inequality are shown by the author to be consequences of peculiar local circumstances, such as the particular form of the coast, the distance which the tide wave has travelled over, and the meeting of tides proceeding in different directions; and he traces the influence of each of these several causes in producing these differences. A diurnal difference in the height of the tides manifests itself with remarkable constancy along a large portion of the coast under consideration. The tide hour appears to vary rapidly in rounding the main promontories of the coast, and very slowly in passing along the shores of the intervening bays; so that the cotidal lines are brought close together in the former cases, and, in the latter, run along nearly parallel to the shore; circumstances which will also account for comparative differences of level, and of corresponding velocities in the tide stream. The author intends to prosecute the subject when the whole of the returns of these observations shall have undergone reduction.

A paper was also read, entitled, "Copies of Registers of the Thermometer kept at Alford, Aberdeenshire." By the Rev. James Farquharson, F.R.S.

The observations recorded in these tables were made at $9^h\ 15^m$ A.M., and at $8^h\ 30^m$ P.M., each day of the year 1833; and the highest and lowest temperatures in each month observed from the indications of Six's thermometer. The author remarks that the differences between the temperature of the morning and evening hours of observation were greatest, on an average, during clear weather; that is, when the radiation of heat from the ground is greatest.

The reading of another paper, by the same author, entitled "On the Ice, formed under peculiar circumstances, at the bottom of running Water," was commenced, but not concluded.

SIR BENJAMIN COLLINS BRODIE, Bart., Vice-President, in the Chair.

The reading of a paper entitled, "On the Ice, formed under peculiar circumstances, at the bottom of running Water." By the Rev. James Farquharson, of Alford, F.R.S., was resumed and concluded.

The ice, which is frequently observed to collect at the bottom of streams and rivers, differs in appearance from that which is formed at the surface; for, instead of assuming the shape of solid glass-like plates, it has more the appearance of aggregated masses of snow, and is composed of small crystals of ice adhering together irregularly, either by their sides or angles. Rivers are sometimes so choked up by accumulations of ground-ice of this description, that they are not only impeded in their course, but also raised considerably above their banks. While in this state, a slight change in the weather will frequently occasion the complete disengagement of this ice from the bottom; so that, in a very short space of time, the river returns into its natural channel;

and then, although it may be frozen at the surface, it continues to flow over a perfectly clear bottom. All these phenomena are considered by the author as perfectly explicable on the theory he advances, of different degrees of radiation of heat occurring from the bottom according to variations of circumstances. He conceives that when this radiation takes place from the solid opake materials of the bed of the stream, through the stratum of transparent water, congelation is induced on that portion of fluid, already cooled down to the freezing-point, which is in immediate contact with the radiating body. The circumstances which, by favouring radiation, contribute to this effect, are, principally, great clearness of the sky, and great transparency of the water; the bottom of the river being cooled below the freezing-point sooner than the water which is flowing over it; and the ice, formed at the bottom, remaining attached to it, as long as the heat which is transmitted from below continues to be lost by radiation. The formation of ground-ice is favoured by the intestine motions incident to a rapid current; because the different strata of fluid, which in still water would have arranged themselves, according to their specific gravities, in the order most conducive to the congelation of the surface, being continually mixed together, the whole body of water is cooled more uniformly.

The Society then adjourned over the Easter recess to meet again on the 30th instant.

April 30, 1835.

The REV. PHILIP JENNINGS, D.D., Vice-President, in the Chair.

A paper was read, entitled, "Continuation of the paper on the relations between the Nerves of Motion and of Sensation, and the Brain; and more particularly on the structure of the Medulla Oblongata and of the Spinal Marrow." By Sir Charles Bell, F.R.S.

The author enters into a minute anatomical investigation of the structure of the spinal cord, and of its relations with the encephalon, and with the origins of the nerves. He finds that the spinal cord is constituted, in its whole length, by six pairs of columns, namely, two posterior, two lateral, and two anterior; each column being composed of concentric layers, and invested with an external coating of cineritious substance, and all the columns being divided from each other by deep sulci, which penetrate nearly to the centre of the cord. On tracing the posterior columns in their ascent towards the encephalon, they are seen to diverge laterally at the *calamus scriptorius*, or bottom of the fourth ventricle, and to proceed into the substance of the cerebellum. Each of these posterior columns is here found to consist of two portions, the outermost being the largest; and they now constitute the *processus cerebelli ad medullam oblongatam*. This subdivision of the posterior columns may be traced throughout the whole length of the spinal cord. The lateral columns give origin to the posterior roots of the spinal nerves, and are therefore the parts subservient to sensation. In ascending towards the brain, each of these co-